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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,376

12/05/2005

Masamichi Morita

Q86778

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23373 7590 07/22/2009  
SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
SUITE 800  
WASHINGTON, DC 20037

EXAMINER

HIGGINS, GERARD T

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

07/22/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/528,376	<b>Applicant(s)</b> MORITA ET AL.	
	<b>Examiner</b> GERARD T. HIGGINS	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) 7-9 and 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 15-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/03/2009 has been entered.

### ***Response to Amendment***

2. The amendment filed 06/03/2009 has been entered. Currently claims 1-9 and 11-18 are pending, claims 7-9 and 11-14 are withdrawn, claim 10 is cancelled, and claims 15-18 are new.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 18 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Examiner does not find support for the limitation that the fluorine-containing organic silane compound has a "branched perfluoroalkyl group having 2 or 3 carbon atoms" in the specification as originally filed. Examples 2 and 3 in Table 4 are for specific compounds and do not provide support for broadly claiming compounds having 2 or 3 carbon atoms; furthermore, the examples 2 and 3 do not have a branched 2 carbon atom group as such a group is not possible (see section 6 below).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how a branched perfluoroalkyl group can only have "2...carbon atoms." In order to have a branched perfluoroalkyl group, there must be at least 3 carbon atoms, i.e. an isopropyl group, in order to have any branched structure. The Examiner interprets the claim as being drawn to a branched perfluoroalkyl group having 3 carbon atoms.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

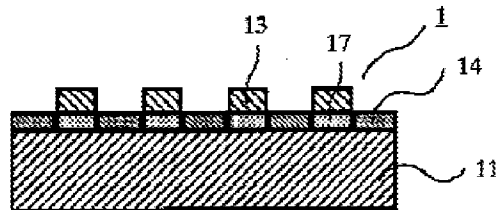
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-6, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishida (JP 2002-023356), machine translation included.

With regard to claim 1, Ishida discloses a material useful for semiconductor devices, displays, LED's etc. [0002] and Figure 5. The substrate **11** is the same type of materials as used by applicants [0013], and there is an alternating line pattern [0031] comprised of a 1<sup>st</sup> (**14**) and 2<sup>nd</sup> (**17**) self-organization organic thin films [0017] and [0018], respectively. The 1<sup>st</sup> self-organization film is comprised of fluoro alkyl silanes such as trifluoropropyl trimethoxysilane, which is the same as a trifluoromethyl-ethylene trimethoxysilane. This compound will form an organic silane polymer compound derived from a monomer which has a perfluoroalkyl group having 5 or less carbon atoms such as in applicants' point (c) of claim 1. Applicants consider the trifluoromethyl of the longer propyl carbon chain to be a "perfluoroalkyl group" as seen at page 19, lines 8-13 of their specification. A conductive material is then formed above the 2<sup>nd</sup> self-organizing film by use of a plating method [0033]. The device is anisotropic because the characteristics of the surface will differ in the direction of the alternating line pattern.

【図5】



With regard to claim 2, the Examiner deems that the surface free energy difference between the alternating line patterns on the device of Ishida inherently comprises the values claimed. The Examiner deems this to be so because Ishida teaches at [0004] that it is known in the art that the functionality of the alternating lines changes the surface characteristics of the alternating lines. Surface free energy is a “surface characteristic” as taught by Ishida; furthermore, since the materials of the alternating line pattern are the same as those claimed by applicants, they would inherently display the surface free energy difference claimed by applicants.

With regard to claim 3, Ishida teaches at [0031] that the width and pitch of the lines are 20 microns.

With regard to claim 4, Ishida teaches at [0015] that the self-organization layers of the present invention are excellent in forming “uniform films with a molecular level.” A uniform film would necessarily have an unevenness of less than 10 nm, especially considering the organic films are on the order of 3 nm thick [0014].

With regard to claim 5, the Examiner deems that the device of Ishida would intrinsically comprise the testing conditions of applicants’ claim 5. The Examiner has

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deems this to be so because the materials that comprise the alternating line pattern of Ishida are the same as those claimed by applicants.

With regard to claim 6, Ishida teaches at [0018] that the 2<sup>nd</sup> self-organizing material may have a thiol functional group on the surface thereof.

With regard to claim 15, Ishida et al. teach at [0014] and [0015] that a monomolecular film is formed. Both lines of the alternating-line pattern are made of a monomolecular film in order to result in the very thin nature of the organic molecular film, i.e. about 1 or 3 nm.

With regard to claim 16, Ishida teaches at [0035] that a conductive nickel film was plated onto the alternating line pattern to a thickness of 0.1 micron, which reads on the limitations of the claim.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

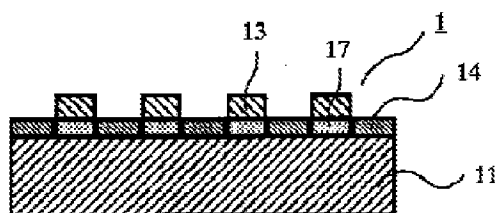
10. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (JP 2002-023356), machine translation included, in view of either Ishida et al. (JP 2001-284289) or Furusawa et al. (JP 2001-284274).

Ishida '356 discloses all of the limitations of applicants' claim 1 in section 8 above; however, Ishida '356 fails to teach that the trifluoromethyl of the trifluoropropyl

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trimethoxysilane is a branched perfluoroalkyl group having 5 or less carbon atoms, particularly 3 carbon atoms.

【図5】



Ishida et al. '289 disclose at [0015] that these same kinds of semiconductor devices can have an alternating pattern formed with a siloxane that has an  $-R(CF(CF_3)_2)$  group, wherein  $(CF(CF_3)_2)$  reads on applicants' perfluoro group having 5 or less carbon atoms, particularly 3 carbon atoms. In this instance the Examiner is reading the 'R' to be an alkyl linkage to the silicon.

Furusawa et al. disclose at [0020] that these same kinds of semiconductor devices can have an alternating pattern formed with a siloxane that has an  $-R(CF(CF_3)_2)$  group, wherein  $(CF(CF_3)_2)$  reads on applicants' perfluoroalkyl group having 5 or less carbon atoms, particularly 3 carbon atoms. In this instance the Examiner is reading the 'R' to be an alkyl linkage to the silicon.

Since Ishida '356, Ishida et al. '289, and Furusawa et al. are drawn to semiconductor devices; it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the perfluoroisopropyl group of either Ishida et al. '289 or Furusawa et al. as the trifluoromethyl group of the trifluoropropyl group of the 1<sup>st</sup> self-organizational film of Ishida '356. The results of

which would have been predictable to one having ordinary skill; specifically, one of ordinary skill would understand that a perfluorinated isopropyl group compared to the trifluoromethyl group would be more non-polar and more lipophilic. This is beneficial because it would more precisely allow the conductive material to go on the 2<sup>nd</sup> thin film. This substitution would generate an alternating-line pattern that would comprise a fluorine-containing organic silane compound that would read on both the fluorine compounds of choices (a) and (c) of claim 1.

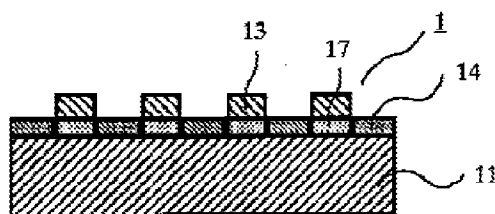
11. Claims 1-6, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (JP 2002-023356) in view of Katz et al. (EP 1041652).

With regard to claim 1, Ishida discloses a material useful for semiconductor devices, displays, LED's etc. [0002] and Figure 5. The substrate **11** is the same type of materials as used by applicants [0013], and there is an alternating line pattern [0031] comprised of a 1<sup>st</sup> (**14**) and 2<sup>nd</sup> (**17**) self-organization organic thin films [0017] and [0018], respectively. The 1<sup>st</sup> self-organization film is comprised of fluoro alkyl silanes such as trifluoropropyl trimethoxysilane, which is the same as a trifluoromethyl-ethylene trimethoxysilane. This compound will form an organic silane polymer compound derived from a monomer which has a perfluoroalkyl group having 5 or less carbon atoms such as in applicants' point (c) of claim 1. Applicants consider the trifluoromethyl of the longer propyl carbon chain to be a "perfluoroalkyl group" as seen at page 19, lines 8-13 of their specification. A conductive material is then formed above the 2<sup>nd</sup> self-organizing film by use of a plating method [0033]. The device is anisotropic because

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the characteristics of the surface will differ in the direction of the alternating line pattern; however, Ishida fails to teach the use of a layer of a semiconductor compound as the functional material.

【図5】



Katz et al. teach using organic semiconductor materials as a functional material for fabricating circuitry (Abstract and [0022] to [0023]). These materials can be bound to fluorinated silane surfaces [0030] and [0031].

Since Ishida and Katz et al. are both drawn to patterning of substrates for circuit technology, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the organic semiconductor materials of Katz et al. as the functional material of Ishida. The results of which would have been entirely predictable to one having ordinary skill in the art of semiconductor manufacture. Specifically, one of ordinary skill would understand that the organic semiconductor material would bind to the 1<sup>st</sup> self-organizing material (fluoro alkyl silanes) instead of binding to the thiol or amino modified 2<sup>nd</sup> self-organizing material.

With regard to claim 2, the Examiner deems that the surface free energy difference between the alternating line patterns on the device of Ishida intrinsically comprises the values claimed. The Examiner deems this to be so because Ishida

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teaches at [0004] that it is known in the art to vary the functionality of the alternating lines to thereby change the surface characteristics of the alternating lines. Surface free energy is a “surface characteristic” as taught by Ishida; furthermore, since the materials of the alternating line pattern are the same as those claimed by applicants, they would intrinsically display the surface free energy difference claimed by applicants.

With regard to claim 3, Ishida teaches at [0031] that the width and pitch of the lines are 20 microns.

With regard to claim 4, Ishida teaches at [0015] that the self-organization layers of the present invention are excellent in forming “uniform films with a molecular level.” A uniform film would necessarily have an unevenness of less than 10 nm, especially considering the organic films are on the order of 3 nm thick [0014].

With regard to claim 5, the Examiner deems that the device of Ishida would intrinsically comprise the testing conditions of applicants’ claim 5. The Examiner deems this to be so because the materials that comprise the alternating line pattern of Ishida are the same as those claimed by applicants.

With regard to claim 6, Ishida teaches at [0018] that the 2<sup>nd</sup> self-organizing material may have a thiol functional group on the surface thereof.

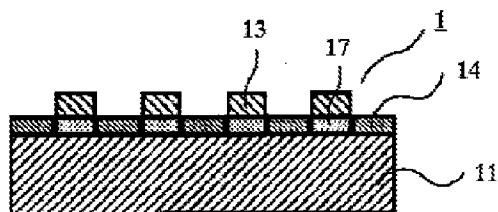
With regard to claim 15, Ishida et al. teach at [0014] and [0015] that a monomolecular film is formed. Both lines of the alternating-line pattern are made of a monomolecular film in order to result in the very thin nature of the organic molecular film, i.e. about 1 or 3 nm.

With regard to claim 16, Ishida teaches at [0035] that a conductive nickel film was plated onto the alternating line pattern to a thickness of 0.1 micron, which reads on the limitations of the claim.

12. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (JP 2002-023356), machine translation included, in view of Katz et al. (EP 1041652), as applied to claim 1 above, and further in view of either Ishida et al. (JP 2001-284289) or Furusawa et al. (JP 2001-284274).

Ishida '356 in view of Katz et al. disclose all of the limitations of applicants' claim 1 in section 11 above; however, they fail to teach that the trifluoromethyl of the trifluoropropyl trimethoxysilane is a branched perfluoroalkyl group having 5 or less carbon atoms, particularly 3 carbon atoms.

【図5】



Ishida et al. '289 disclose at [0015] that these same kinds of semiconductor devices can have an alternating pattern formed with a siloxane that has an  $-R(CF(CF_3)_2)$  group, wherein  $(CF(CF_3)_2)$  reads on applicants' perfluoro group having 5 or less carbon atoms, particularly 3 carbon atoms. In this instance the Examiner is reading the 'R' to be an alkyl linkage to the silicon.

Furusawa et al. disclose at [0020] that these same kinds of semiconductor devices can have an alternating pattern formed with a siloxane that has an  $-R(CF(CF_3)_2)$  group, wherein  $(CF(CF_3)_2)$  reads on applicants' perfluoroalkyl group having 5 or less carbon atoms, particularly 3 carbon atoms. In this instance the Examiner is reading the 'R' to be an alkyl linkage to the silicon.

Since Ishida '356, Ishida et al. '289, and Furusawa et al. are drawn to semiconductor devices; it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the perfluoroisopropyl group of either Ishida et al. '289 or Furusawa et al. as the trifluoromethyl group of the trifluoropropyl group of the 1<sup>st</sup> self-organizational film of Ishida '356. The results of which would have been predictable to one having ordinary skill; specifically, one of ordinary skill would understand that a perfluorinated isopropyl group compared to the trifluoromethyl group would be more non-polar and more lipophilic. This is beneficial because it would more precisely allow the conductive material to go on the 2<sup>nd</sup> thin film. This substitution would generate an alternating-line pattern that would comprise a fluorine-containing organic silane compound that would read on both the fluorine compounds of choices (a) and (c) of claim 1.

### ***Response to Arguments***

13. Applicant's arguments, see Remarks, filed 06/03/2009, with respect to the objection to claim 1 have been fully considered and are persuasive. The objection has been withdrawn.

14. Applicant's arguments filed 06/03/2009 have been fully considered but they are not persuasive.

Applicants' argue that the declaration presented under 37 CFR 1.132 is sufficient to overcome the present rejections based upon prior art.

The Declaration under 37 CFR 1.132 filed 06/03/2009 is insufficient to overcome the rejection of claims 1-6 based upon the references Ishida (JP 2002-023356), Katz et al. (EP 1041652), Ishida et al. (JP 2001-284289), or Furusawa et al. (JP 2001-284274) as set forth in the last Office action.

The source of confusion is drawn to the identity of the "perfluoroalkyl group." According to applicants' specification at page 17, lines 2-5 and page 19, lines 8-13 for fluorine compounds (a) and (c), the perfluoroalkyl group may be designated as a **portion** of the entire group bonded to the silicon, e.g.  $(\text{CF}_3)_3\text{C-A-SiX}_3$  is listed as having a perfluoroalkyl group even though the substituent 'A' is an alkylene group, i.e. not fluorinated, having 1 to 4 carbon atoms (applicants' specification page 17, line 10). According to applicants, only the portion that has the fluoro substituents is designated as the "perfluoroalkyl group."

Ishida et al. teach a 1<sup>st</sup> self-organization film is comprised of fluoro alkyl silanes such as trifluoropropyl trimethoxysilane, which is the same as a trifluoromethyl-ethylene trimethoxysilane. This compound will form an organic silane polymer compound derived from a monomer which has a perfluoroalkyl group having 5 or less carbon atoms such as in applicants' point (c) of claim 1. The trifluoromethyl is a perfluoroalkyl

group having 5 or less carbon atoms. As such the rejection of claims 1 has been changed to a rejection under 35 U.S.C. 102(b) as being anticipated by Ishida et al. This means a declaration showing unexpected results is ineffective because the rejection is of anticipation and not obviousness. As cited in MPEP 706.02(b), it is noted that a rejection based on 35 USC 102(b), can only be overcome by (a) persuasively arguing that the claims are patentably distinguishable from the prior art, (b) amending the claims to patentably distinguish over the prior art, or (c) perfecting priority under 35 USC 119(e) or 120. As can be seen, comparative data is not sufficient to overcome an anticipatory rejection under 102(b). Please note that the rejection in section 11 above, albeit under 35 U.S.C. 103(a), discloses the same 1<sup>st</sup> self-organization film, and therefore the declaration is ineffective against this rejection as well.

The Examiner also notes that the declaration is ineffective because it is not commensurate in scope with the claimed invention. Applicants are testing contact angles using n-hexadecane and xylene; however, there is no requirement to have such contact angles or dynamic wet characteristics in the presently claimed invention. Additionally, this evidence is not persuasive given that the courts have upheld that a "basic property or utility must be disclosed in order for affidavit evidence of unexpected properties to be offered," *In re Davies et al.*, 177 USPQ 381 (CCPA 1973).

The Examiner recognizes applicants statement that "perfluoropropyl trimethoxysilane and perfluoroisopropyl trimethoxysilane cannot be prepared due to an impossible direct bond between a perfluoroalkyl group and an Si atom," and has removed rejections based upon perfluorinating the entire propyl group; however, upon

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reconsideration the references Ishida et al. (JP 2001-284289) and Furusawa et al. (JP 2001-284274) are found to disclose an  $-R(CF(CF_3)_2)$  group, wherein  $(CF(CF_3)_2)$  reads on applicants' branched perfluoro group having 5 or less carbon atoms, particularly 3 carbon atoms. In this instance the Examiner is reading the 'R' to be an alkyl linkage to the silicon as would be understood of one of ordinary skill in the art.

Since Ishida '356, Ishida et al. '289, and Furusawa et al. are drawn to semiconductor devices; it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the perfluoroisopropyl group of either Ishida et al. '289 or Furusawa et al. as the trifluoromethyl group of the trifluoropropyl group of the 1<sup>st</sup> self-organizational film of Ishida '356. The results of which would have been predictable to one having ordinary skill; specifically, one of ordinary skill would understand that a perfluorinated isopropyl group compared to the trifluoromethyl group would be more non-polar and more lipophilic. This is beneficial because it would more precisely allow the conductive material to go on the 2<sup>nd</sup> thin film. This substitution would generate an alternating-line pattern that would comprise a fluorine-containing organic silane compound that would read on both the fluorine compounds of choices (a) and (c) of claim 1.

Lastly, it is noted by the Examiner that the current claim language would include Comparison A and Comparison D under the rubric of choice (c) of claim 1.

***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GERARD T. HIGGINS whose telephone number is (571)270-3467. The examiner can normally be reached on M-Th 10am-8pm est. (Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GERARD T. HIGGINS  
Examiner  
Art Unit 1794

/G. T. H./  
Examiner, Art Unit 1794

/Callie E. Shosho/  
Supervisory Patent Examiner, Art Unit 1794

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